

## NEMATICIDE SAFETY IN ORNAMENTAL PLANT NURSERIES

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**INTRODUCTION:** Nematicides used on established plants in production nurseries are all toxic pesticides that can be hazardous to both applicators and those who might handle recently-treated plant material or growing media. This is a summary of some hazards common to all or most of these products as well as some that are product-specific. Information was gathered from many sources, including labels and associated labeling material, material safety data sheets, and direct communication with company representatives and regulatory agencies.

Products containing three different active ingredients are registered for nematode control in established plants in production nurseries. The active ingredients and most common products used in nurseries are:

<u>Common Name</u>	<u>Trade Name &amp; Manufacturer</u>
ethoprop:	Mocap EC, Mocap 10G (Rhone-Poulenc, Inc.)
fenamiphos:	Nemacur 10G (Mobay)
oxamyl:	Vydate L (DuPont), Oxamyl 10G (Miller Chemical & Fertilizer Corp.)

THIS PAPER CANNOT BE SUBSTITUTED FOR THE LABEL, but indicates the kinds of important information about personal and environmental safety that one should seek from product labels. Pay particular attention to all label sections with headings such as "Precautionary Statements," "Hazards to Humans and Domestic Animals," "Environmental Hazards," "Physical and Chemical Hazards," "Directions for Use" and "Storage and Disposal."

No references are cited at the end of this circular because, in most questions regarding what can and should be done regarding a pesticide, the information on THE LABEL IS THE LAW. Therefore, your references must be all pertinent labeling materials and regulations. The USER OF A PESTICIDE MUST READ THE LABEL and other information provided by the product registrant to know how to use any pesticide safely, legally and effectively. Failure to obey label instructions about application of a pesticide, including protective clothing, application practices and safety precautions, is a violation of Federal pesticide regulations.

**SITE AND APPLICATOR RESTRICTIONS:** Most nematicides registered for use in nurseries are Restricted Use Pesticides for retail sale to and use only by certified applicators or persons under the direct supervision of a certified applicator, and only for those uses covered by their certification. They should not be applied on plants or other sites not specified on the labels, and specific prohibitions must be obeyed. For example:

Do not plant crops in soil treated with a product until the specified waiting period (Vydate L, 6 months; Nemacur 10G, 120 days) has elapsed, to avoid exposing non-registered plant species to the active ingredient.

Unless specifically permitted on the label, do not use these products to treat potting soil or other growing media. Soil into which such pesticides have been incorporated can be extremely dangerous to persons who are not aware of the presence of the pesticide in the mix. This practice is specifically prohibited by some labels.

**PRECAUTIONARY STATEMENTS. HAZARDS TO HUMANS AND DOMESTIC ANIMALS:** Since these are similar pesticides, their labels have many similar Precautionary Statements. The following paragraphs paraphrase most label statements, but YOU MUST READ THE LABEL of the specific product you plan to use.

These products are poisonous if swallowed, inhaled or absorbed through the skin or by eye contact; some are rapidly absorbed through the skin. Do not breathe their dust, vapors or spray mists. Wash hands, arms and face before eating, smoking or going to the bathroom. Bathe at the end of the work day, washing your entire body and hair with soap and water.

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**SYMPTOMS OF POISONING AND FIRST AID:** All of these nematicides are carbamate or organophosphate pesticides that act on the critical nervous system enzyme, cholinesterase, so they cause similar symptoms. The rate at which symptoms appear and their severity depend on the chemical to which one has been exposed and the dosage taken into the body. Symptoms generally characteristic of these pesticides include nausea, vomiting, abdominal cramps, diarrhea, excessive salivation, runny nose, sweating, headache, dizziness, weakness, constriction of pupils, blurring or dimness of vision, excessive tearing, loss of muscular coordination, slurring of speech, twitching of muscles (especially of tongue and eyelids), mental confusion, disorientation, drowsiness, difficulty in breathing (chest tightness), slow pulse and unconsciousness.

**CHRONIC EXPOSURE.** Cholinesterase inhibition from a single exposure to an organophosphate pesticide (fenamiphos, ethoprop, many insecticides) may persist 2 to 6 weeks. Thus, repeated exposure to small amounts of these materials may result in unexpected cholinesterase depression. Exposure to an amount of either an organophosphate or carbamate pesticide that would not normally produce symptoms in a person who had not been exposed previously may produce severe symptoms of cholinesterase inhibition in one who has been exposed previously to any cholinesterase inhibiting pesticide whose effects are persistent.

**THE FIRST STEP** in treating any suspected pesticide poisoning is to remove the victim from further contact with the chemical.

**FIRST AID.** In case of skin contact, remove clothing and wash all exposed areas immediately with plenty of soap and water. If eyes are contaminated, wash with flowing water for at least 15 minutes and call a physician. If swallowed, call a physician or Poison Control Center or go to an emergency room. If victim is conscious, induce vomiting; never induce vomiting or give anything by mouth to an unconscious person. Persons assisting or giving first aid should avoid contaminating themselves. The victim should not be left alone until recovery is complete. If in doubt, call a doctor!

**PERSONAL PROTECTION WHEN HANDLING CHEMICALS:** These pesticides are potentially hazardous even to someone exposed to only a little dust or fine spray mist. Each label has its own specific warnings; the following are the minimum precautions that should be taken, if more stringent protective measures are not specified. All personnel who are working near the area of application, not just applicators, must be protected as specified on the product label. Unprotected persons must be removed from the area before application!

**EYE PROTECTION.** Goggles are needed to prevent dust or mist from reaching the eyes, which are highly susceptible to pesticides. An eye wash apparatus should be available.

**RESPIRATORY PROTECTION.** A pesticide respirator approved by the Mine Safety and Health Administration or National Institute of Occupational Safety and Health is needed. The Mocap EC label specifies the AO model R-6058 with R-58 cartridge or equivalent during field operations.

**SKIN COVERING.** These pesticides are all water-soluble; most labels specify that protective clothing, especially gloves, should be made of waterproof materials such as latex or neoprene. Each product label specifies minimal clothing, gloves, rubber boots, and goggles or face shield when handling, mixing, or loading these products. Do not use the same gloves for other work and clean or dispose of gloves after each use. Wear clean clothes daily and launder contaminated clothing thoroughly and separately, to avoid contaminating other laundry with pesticide. **HEAVILY CONTAMINATED CLOTHING CANNOT BE ADEQUATELY DECONTAMINATED.** Similarly, leather footwear readily absorbs water solutions of any of these products, and cannot be adequately decontaminated; **DISCARD CONTAMINATED SHOES OR BOOTS.**

**EQUIPMENT:** Improper equipment and/or maintenance can pose serious risks to applicator, bystanders, the environment and the crop.

**'Fines' (dust)** of granular nematicides can easily carry the chemicals into the body via the respiratory tract, eyes, or mouth. Do not use applicators that can grind the granules to produce more dust. Stay upwind of the product when opening bags and filling application equipment. Do not apply these products with a knapsack applicator or similar equipment that is placed on the user's body, such as centrifugal spreaders or seeders that are strapped to the user's body.

**Equipment deterioration.** The label of Mocap EC specifically warns that spray mixtures may affect some plastic materials after prolonged use. Spray tubing, hoses and gaskets should be inspected frequently, particularly

black-colored materials. Replace any material which is softened or swollen. Polyethylene, polypropylene, nylon and Teflon materials are recommended for most products. Polyvinyl chloride (PVC) is not recommended.

**REENTRY:** Some product labels bear specific warnings against reentering treated areas without protective clothing, etc., until some period of time has passed or some process has been completed to make it safe. The Nematicur 10G label states that unprotected workers shall not enter treated areas within 48 hours after application, and impervious boots and gloves must be worn when entering treated fields that are muddy or wet within 7 days of application of either product. Mocap EC and Mocap 10G labels state that unprotected persons may enter a treated field or area after chemical has been mixed into the soil.

The label for Vydate L prohibits unprotected reentry for 48 hours after treatment and requires posting treated areas:

"Do not enter treated areas without appropriate protective clothing until sprays have dried. Written or oral warnings must be given to workers who are expected to be in a treated area or in an area about to be treated with this product. ...'DANGER--POISON. Area treated with Vydate L on (date of application). Do not enter treated areas for 48 hours after application unless protective clothing is worn. If warning symptoms appear, refer to Statement of Practical Treatment on front panel of 'Vydate' L label and seek medical attention at once."

**HANDLING TREATED PLANTS:** Specific warnings about safe waiting periods between treatment and handling of plant material are found on Mocap labels; it seems reasonable to expect potentially hazardous levels of these compounds to last for similar periods in other situations. When in doubt, avoid contact with treated soils, plants, etc.

Mocap EC. Treated plants (bare-root and tuber dip) should be tagged: "Warning. Wear rubber gloves when handling treated plants."

Mocap 10G. Do not cut or handle treated sod for 21 days after treatment.

**STORAGE:** Do not store nematicides in or around the home. Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container only, in well-ventilated, clean, dry, locked area out of reach of children and animals. Do not store where extreme temperatures occur (e.g., Vydate L should not be subjected to temperatures below 32° F, and Nematicur 10G should not be stored where temperatures exceed 120° F). Do not use containers to store food, feed, or drinking water.

**DISPOSAL:** Wastes and emptied containers of these pesticides pose a very difficult disposal problem. Label instructions often differ in details, but certain common threads run through most of them:

1. Empty container completely into application equipment, then dispose of the container as local, state, and federal laws permit. If local laws and conditions permit, dispose of bags by burning and stay out of the smoke. Containers of liquid products should be triple-rinsed and the rinse material added to the spray tank before disposal.

2. Spills must be treated with caution. Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid skin contact or breathing dusts. A fine water spray mist, plastic cover or floor sweeping compound may be used to prevent generating dusts if necessary. Sweep spill together into a pile and dispose of it as directed on the individual product label.

3. Most labels list a 24-hour 'hot-line' telephone number by which the manufacturer can be consulted regarding handling a spill or any similar emergency. In addition, there is an industry-wide service called Chemtrec which can give aid and information in pesticide emergencies at any time of day or night: 800/424-9300.

**FIRES:** The active ingredients can be transported in the smoke from a fire. Advise city firemen of the potential dangers of the chemicals involved. Avoid contact with smoke. Fight fire from upwind. Use self-contained breathing equipment. Always wear prescribed clothing and equipment when entering a building to fight a fire. Use dry chemical, carbon dioxide, or foam to extinguish the fire if at all possible. Water spray may be used to cool exposed containers. Contain runoff to prevent entry into sewers or waterways.

Isolate the area. Stay out of smoke and vapor. Evacuate the immediate surrounding area and residential areas downwind. Wear prescribed clothing and equipment. Monitor any water run-off and dike surrounding area. After fire fighting operations, remove contaminated clothing and shower thoroughly, including hair, using plenty of soap. Contact the manufacturer for emergency advice and decontamination instructions.

Mocap EC is a flammable liquid. Do not use or store near heat or open flame.

Vydate L is a flammable liquid whose vapor forms an explosive mixture with air; it may be ignited by heat, sparks or open flame.

**ENVIRONMENTAL HAZARDS:** All of these products are toxic to aquatic organisms (fish and invertebrates), birds and other wildlife. Drift and runoff from treated areas may be hazardous to fish and other aquatic organisms; do not apply them directly to lakes, streams, ponds, or wetlands, or where there is a high risk of runoff into such bodies of water. The Mocap EC label specifically directs that it not be applied within 140 feet of inland freshwater habitats or 800 feet of brackish water habitats along the Atlantic seaboard. Birds feeding in treated areas may be killed. Granules or contaminated surface soil resulting from treatment or small spills and material left on the surface in turn areas at row ends should be incorporated into the soil to avoid exposing birds and wildlife to them. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by improper cleaning of equipment or disposal of wastes.

The Vydate L label specifically warns of high toxicity to bees; do not use it while bees are actively visiting the treatment area and avoid drift to areas where bees are actively working.

A specific Ground Water Advisory on the Vydate label addresses a risk common to all soluble pesticides:

"Residues of 'Vydate' L can seep or leach through soil and can contaminate ground water which may be used for drinking. Users are advised not to apply 'Vydate' L where the water table is close to the surface and where soils are very permeable, i.e., well-drained soils such as loamy sands. Local agricultural Agencies can provide information on the soil type in your area and the location of the ground water."

Keeping the risk of leaching in mind, do not apply these products at a time when heavy irrigation or rainfall is likely to accelerate their loss from the root zone and contamination of ground water through leaching.